

## **RESONANT CONTROLLED QUBIT SYSTEM**

### **ABSTRACT**

5        A circuit comprising a superconducting qubit and a resonant control system that is characterized by a resonant frequency. The resonant frequency of the control system is a function of a bias current. The circuit further includes a superconducting mechanism having a capacitance or inductance. The superconducting mechanism coherently couples the superconducting qubit to the resonant control system. A method for entangling a  
10      quantum state of a first qubit with the quantum state of a second qubit. In the method, a resonant control system, which is capacitively coupled to the first and second qubit, is tuned to a first frequency that corresponds to the energy differential between the lowest two potential energy levels of the first qubit. The resonant control system is then adjusted to a second frequency corresponding to energy differential between the lowest two  
15      potential energy levels of the second qubit.